REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

The Office Action indicates that claims 2-13, 16, 17, 19-22, 24-34 and 36-58 are pending in the subject application. In this regard Applicants bringing the following to the Examiner's attention. Claim 59 was previously added by Applicants, however, this claim is not indicated as being pending and further this claim does not appear to have been examined. As such, Applicants request that the USPTO correct its records accordingly.

Claims 2-6 are acknowledged as being allowable by the Examiner.

Claims 1, 14, 15, 18, 23 and 35 were previously canceled without disclaimer or prejudice to further prosecuting these claims in a continuing application.

Claims 7-9, 16, 17, 19-22, 24-34, 36, 37 and 44-58 stand rejected under 35 U.S.C. §103. Claims 10-13 and 38-43 were objected to as depending from a rejected base claim; however, the Examiner indicated that these claims would be allowable if appropriately re-written in independent form.

Claim 31 was canceled in the foregoing amendment without disclaimer or prejudice and claim 28 was amended to include the limitations of canceled claim 31.

The amendment(s) to the claim(s) are supported by the originally filed disclosure.

35 U.S.C. §103 REJECTIONS

Claims 7-9, 16, 17, 19-22, 24-34, 36, 37 and 44-58 stand rejected under 35 U.S.C. § 103 as being unpatentable over the cited prior art for the reasons provided on pages 2-13 of the above-referenced Office Action. As indicated herein, the limitations of claim 31 were added to claim 28 and claim 31 was canceled. As such, Applicants do not believe that the rejection of claim 31 need be separately addressed further herein. The following addresses the specific rejections provided in the above-referenced Office Action.

CLAIMS 7, 19, 24

Claims 7, 19 and 24 stand rejected as being unpatentable over Yanagi et al. [USP 6,359,607; "Yanagi"] in view of Yamaguchi et al. [US Patent Pub No. 2003/ 0151573; "Yamaguchi"] for the reasons provided on pages 2-4 of the above referenced Office Action. Applicants respectfully traverse.

As grounds for the rejection of claim 7, the above-referenced Office Action asserts that Yanagi discloses a method as set forth in claim 7 and/ or a related display except that Yanagi fails to teach displaying by pulse width modulation. It is further asserted that Yamaguchi discloses a time modulation means that first carries out pulse width modulation in one frame and controls the display tone level of each of the cells that make up a picture element 41 of a monochromatic image being displayed. It thus is asserted that it would have been obvious to one skilled in the art to combine the pulse width modulation technique taught by Yamaguchi with the method as taught in Yanagi. Applicants respectfully traverse.

Applicants claim, claim 7, a method for driving an image display device; where such a method includes applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines. More particularly, such a method includes displaying tones by shifting phases of waveforms of the signal lines and the scanning lines, and polarities of pixels in a signal line direction are inverted alternately. Applicants would also suggest referring to the discussion in the subject application regarding the second embodiment for further details of the foregoing claimed features.

Applicants would first note that the grounds for rejection are inherently inconsistent. It is asserted in the Office Action that Fig. 12 of Yanagi teaches displaying tones by modulating a pulse width of a two-value voltage supplied to signal lines and wherein tones are displayed by shifting phases of the signal line and the scanning lines. It is further asserted in the Office Action, however, that Yanagi fails to teach displaying by pulse width modulation and then continues with the discussion regarding the teaching of Yamaguchi. It is confusing in that it is asserted that Yanagi teaches teach pulse width modulation and also that Yanagi does not teach pulse width modulation.

Applicants respectfully submits that Yanagi does not teach displaying tones by modulating a pulse width of a two-value voltage signal supplied to the signal lines. It first should be noted that the word "tone," the word "modulate," and the phrase pulse width modulation do not appear anywhere in Yanagi. This is not surprising as the invention in Yanagi is not at directed to controlling the displaying of tones. Thus, while Yanagi does not anywhere disclose

nor teach the foregoing feature in the text or body of the patent; Applicants have understood this rejection to be based on an inference as to what is being shown in figure 12 of Yanagi.

It also would appear that this feature is being inferred from figure 12 because of the further assertion in the Office Action that Yanagi teaches displaying tones by shifting phases of waveforms of the signal lines and the scanning lines. While it is true that the waveforms for Vs and Vg are not in phase, this does not necessarily mean that this discloses modulating tones using a pulse width modulation technique.

It is not described or taught anywhere in Yanagi that the phases of the Vs and Vg waveforms are shifted to control the pulse width of the Vs waveform nor is there any indication or suggestion in Yanagi that the device being disclosed in Yanagi includes a mechanism for controlling either of these two waveforms so as in effect to control the pulse width of the Vs waveform. Applicants submit that the disclosure in Yanagi actually describes a process that does not exert any such control.

Yanagi describes the operation of the selection switch 3b that selects the voltage (Vgh or Vgl) for turning the TFT ON or OFF respectively. As indicated in col. 1, line 61 through col. 2, line 4, gate signals (GSP) are sequentially transferred through the flip-flops in response to a clock signal (GCK) and are sequentially outputted to the selection switches 3b. It is further indicated that in response to this, each selection switch 3b selects the voltage Vgh for turning the TFT ON and outputs it to the scanning signal line 105 during one scanning period (TH), and thereafter outputs the voltage Vgl for turning the TFT OFF to the scanning signal line. With this operation,

Yanagi indicates that image signals outputted from the signal line driving circuit 200 to the respective signal lines can be written in respective corresponding pixels.

In sum, the foregoing described operation in Yanagi expressly describes that the clock signals (GCK) control outputting of the signals that control the selection switches. There is no description, suggestion nor teaching, either express or inferred, that the clock signals are adjusted so as to control the pulse width of the image signal.

Also, Yanagi teaches that when a scanning voltage Vgh is applied from the signal line driving circuit 300 to a gate electrode g(i, j) of a TFT of one display pixel P(i, j) during a first field (TF1), the TFT attains an ON state, and an image signal voltage Vsp from the signal line driving circuit 200 is applied to a pixel electrode through a source electrode and a drain electrode of the TFT (see col. 2, lines 23-30). This hardly is an indication that the voltage being outputted from the signal line driving circuit is a fixed voltage level. Rather it would appear from the disclosures referred to above regarding operation of the selection switches 3b, the image signal voltage Vsp is a voltage that corresponds to the tone to be displayed. Thus, it appears to Applicants that it is more proper to infer that Yanagi discloses a device and methodology that controls tones based on varying the voltage Vsp of the image signal.

In sum, Applicants respectfully submit that Yanagi in no way describes, a methodology wherein tones or the gray scales to be displayed result from shifting phases of waveforms of the signal lines and the scanning lines. It also can hardly be said that this description suggest, teaches or offers any motivation for such a methodology. Moreover, it can be hardly said that one skilled in the art would have been apprised of displaying tones in the manner set forth in

claim 1 based on the disclosure in Yanagi on how the image signal voltage is applied to the pixel electrode and how the selection switches 3b, and thus how the pixel electrode is being switched.

As has been provided by the Federal circuit, a 35 U.S.C. §103 rejection based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in a reference, is not proper and the prima facie case of obviousness cannot be properly made. In short there would be no technological motivation for engaging in the modification or change. To the contrary, there would be a disincentive. *In re Gordon*, 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

As indicated above, the device and methodology in Yanagi does not embody pulse width modulation techniques. Thus, if the device and methodology in Yanagi was modified so as to embody pulse width modulation techniques it necessarily follows that such a modification would destroy the function of the invention disclosed in Yanagi.

As to Yamaguchi it appears that the assertion as to the teachings therein is based solely on a sentence from paragraph [0101]. As described in the Yanaguchi, each of the picture elements 41, 42, 43 can be expressed by three cells (*e.g.*, 41a,41b,41c for picture element 41). It is further described that the original image signal (Sorig) is processed by a tone conversion processing means 20 to generate an image signal So and a time modulating means generates cell signals Sa, Sb, Sc based on the generated image signal So.

Yanaguchi also indicates that a cell signal generating means, made up of the time modulating means 12 comprising three time modulating sections 12a, 12b, 12c for each cell and an on-off control means comprising three on-off control sections 13, generates the cell signals for

the cells for a given picture element so that the sum of the output luminances of the cell signals corresponds to the output luminance of the picture element. It is further indicated that the on-off control means 13 turns on and off the cell signals Sa, Sb, Sc input into the respective cells from the time modulation means 12 independently of each other.

In sum, the device and methodology described in Yamaguchi does not describe a process where the width of a pulse is modulated, but rather describes a complex process where image signals are processed and broken down so that signals can be outputted from a plurality or more of cells that make up each picture element and where the signal output operation for each cell is controlled. In other words, Yamaguchi (using its own words) describes a process where display of tone levels is accomplished by a combination of area modulation and time modulation.

Thus, if Yanagi was modified in the fashion described in Yamaguchi, it would not yield the methodology as set forth in claim 7.

Applicants respectfully submit that at least for the foregoing reasons each of claims 19 and 24 also are considered to be distinguishable from the combination of Yanagi and Yamaguchi.

It is respectfully submitted that claims 7, 19 and 24 are patentable over the cited reference(s) for the foregoing reasons.

CLAIMS 8-9, 20-21, 25-26 & 44-47

Claims 8-9, 20-21, 25-26 and 44-47 stand rejected as being unpatentable over Inoue et al [USP 6,504,521; "Inoue"] in view of Hirai, et al. [USP 5,874,933; "Hirai"] and Ino et al. [USP 6,424,521; "Ino"] for the reasons provided on pages 4-6 of the above referenced Office Action.

Applicants respectfully traverse.

Applicants claim, claim 8, a method for driving an image display device, where in the method a voltage is applied between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines. Such a method further includes displaying the tones by shifting phases of waveforms of the signal lines and the common electrode, and polarities of pixels in a signal line direction are inverted alternately.

As previously indicated by Applicants[1], it is clear from the discussion in col. 2, line 22 through col. 3, line 28 of Inoue, that the method for displaying tones does not involve pulse width modulation. Rather it is clear from this discussion that the technique embodied in the method and device described in Inoue for displaying tones, is the technique where the image signal voltage being outputted to signal lines is controlled so as to be one of a plurality of "gray-scale" voltages, which one voltage serves as the signal line drive voltage. This clearly is not a pulse-width modulation technique. Thus, it is clear rather from the discussion in Inoue (see column 2, line 22 to column 3, line 28, and Figures 13 and 14 thereof), that the display device in Inoue embodies and is directed to the voltage variation driving technique, not to the pulse width modulation technique. In addition, in Inoue, tone display is not realized by shifting the waveform phases of the signal line and the common electrode; when Vg (which is a voltage of a scanning line) is ON in Figure 17, the signal line drive voltage b (V0) is held constant.

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[1] See Applicants' Response to Office Action dated March 30, 2004, pp. 30-33.

As has been provided by the Federal circuit, a 35 U.S.C. §103 rejection based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in a reference, is not proper and the prima facie case of obviousness cannot be properly made. In short there would be no technological motivation for engaging in the modification or change. To the contrary, there would be a disincentive. *In re Gordon*, 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

As indicated above, the device and methodology in Inoue the display device in Inoue embodies and is directed to the voltage variation driving technique, not to the pulse width modulation technique. Thus, if the device and methodology in Inoue was modified so as to embody pulse width modulation techniques it necessarily follows that such a modification would destroy the purpose and function of the invention disclosed in Inoue.

As to Hirai, the Office Actions asserts that Hirai teaches that the pulse width modulation technique is well known. While this may be the case, the inquiry does not end there, as it also is required to determine what Hirai teaches as to the prior art. As previously indicated by Applicants, Hirai teaches away from the use of the so-called well known pulse-width modulation technique, more specifically, Hirai teaches that since it is difficult to use the PHM (phase modulation) or PWM (pulse width modulation) method in order to display a multi-gradation picture on a liquid crystal display unit of simple matrix type, a driving method different from the PWM method, is adopted in the invention being described in Hirai.

As provided in MPEP-2145 (XD) a prior art reference that "teaches away" from the claimed invention is significant factor to be considered in determining obviousness. It also is

provided therein that the totality of the prior art must be considered, and proceeding contrary to accepted wisdom in the art is evidence of non-obviousness. *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986). Thus, when the totality of the prior art is considered including the teachings of both Inoue and Hirai, one can see that the prior art teaches away from the use of a pulse width modulation technique. Moreover, neither Inoue nor Hirai provide any indication that if the device/ methodology in Inoue was modified in the suggested fashion that the result would be reasonably successful. Thus, absent the teachings of the subject application, there would be no suggestion to make such a combination and further that such a combination would be reasonably successful.

As previously indicated by Applicant, Ino merely performs a dot-inversion driving method to reduce flickers in a liquid crystal display device and unlike the present invention, Ino does not realize excellent multi-tone displays by holding a constant phase of the common electrode with respect to the scanning signal and carrying out the pulse width modulation driving while performing the one horizontal period inversion driving or dot inversion driving. Still further, Ino, as with Yanagi, does not teach that when the potential of scanning lines is ON, tone display is realized by switching a potential of the signal lines between high level and low level after an elapsed time period which varies depending on the tone.

In sum, Inoue, Hirai and Ino, alone or in combination do *not* provide any discussion, teaching or suggestion of a methodology for driving an image display device that embodies the pulse width modulation technique for displaying the tones and which further includes displaying the tones by shifting phases of waveforms of the signal lines and the scanning lines. Also, there

is no teaching suggestion, or motivation offered in any of these cited references for modifying the methodology disclosed in Inoue so as to yield such a method. Moreover, there is no teaching or suggestion offered in any of these cited references that if the methodology of Inoue were modified so as to yield the invention of claim 8, such a method would be reasonably successful.

Applicants respectfully submit that at least for the foregoing reasons that distinguish the methodology of claim 8 from the combination of references; the method of claim 9, the driving device of either of claims 20 and 21, and/ or the image display device of either of claims 25 and 26, are each distinguishable from the identified combination of references.

It is respectfully submitted that claims 8-9, 20-21, 25 and 26 are patentable over the cited reference(s) for the foregoing reasons.

CLAIMS 22, 27, 48-49 & 52

Claims 22, 27, 48-49 and 52 stand rejected as being unpatentable over Inoue et al [USP 6,504,521; "Inoue"] in view of Hirai, et al. [USP 5,874,933; "Hirai"], Ino et al. [USP 6,424,521; "Ino"] and Okada et al. [USP 5,621,426; "Okada"] for the reasons provided on pages 6-7 of the above referenced Office Action. Applicants respectfully traverse.

Applicants claim, claim 22, a driving device of an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels. Such a driving device applies a voltage between a potential of the

signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displays tones by modulating a pulse width of a two-value voltage supplied to the signal lines. Also, such a driving device includes a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines so that a resistance of a transistor for switching ON or OFF signal application from the signal lines to the pixels is increased with time from a beginning to an end of an application time of a single pixel.

As indicated in the discussion above regarding claims 8-9, 20-21, 25 and 26 the combination of Inoue and Hirai, as well as the combination of Inoue, Hirai and Ino, does *not* provide any discussion, teaching or suggestion of a methodology for driving an image display device that embodies the pulse width modulation technique for displaying the tones and that there also is no teaching suggestion, or motivation offered in any of these cited references for modifying the methodology disclosed in Inoue so as to yield such a method. Moreover, there is no teaching or suggestion offered in any of these cited references that if the device/ methodology of Inoue was modified so as to yield the driving device of claim 22, such a driving device would be reasonably successful. As such, at least for the foregoing reasons, Applicants respectfully submit that claims 22, 27, 48-49 and 52 are distinguishable from the cited combination of references.

The above-referenced Office Action admits that Inoue (and thus apparently the combination of Inoue, Hirai and Ino) does not teach resistance of transistor. The Office Action further asserts that Okada teaches TFT 95 as a switching means and that the resistance is increased in time from zero to a large value (i.e., 10^6 ohms). The Office Action also further

asserts that it would have been obvious to use the apparatus of Inoue as modified by the teachings of Hirai and Ino as well as increasing the resistance of the switch as taught by Okada. Applicants respectfully disagree with the characterization of what is being disclosed and taught in Okada.

As previously indicated by Applicants, figure 16 of Okada describes that a resistance of an analog switch increases with time in a period T_1, which is a period during which an analog switch changes from the On-state to the Off-state. These are mere indications of the switching characteristics of the analog switch. Also, the implied assertion in the Office Action that the resistance would increase when switched from OFF to ON is technically incorrect and impossible as the resistance of a switch in such circumstances actually deceases significantly.

Also, there is no description anywhere in Okada that an amplitude of a voltage supplied to the scanning lines is varied so that the resistance of a transistor for switching ON or OFF signal application from the signal lines to the pixels is increased with time from the beginning to the end of the application time on a single pixel. Further, such an assertion is technically incorrect as to the disclosed switch; when a switch is being switched on or off, the line voltage per se does not change, as the switch cuts off the current flow. If one put a meter across the terminal of the switch there would be a voltage reading.

In sum, the cited combination of references, and more specifically Okada, does not anywhere disclose, teach or suggest a driving device of an image display device which includes *inter alia* a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines so that a resistance of a transistor for switching ON or OFF signal application

from the signal lines to the pixels is increased with time from a beginning to an end of an application time of a single pixel. Applicants also respectfully submit that there is no teaching suggestion, or motivation offered in any of these cited references, including Okada for modifying the driving circuit disclosed in Inoue so as to yield the driving circuit of claim 22. Moreover, there is no teaching or suggestion offered in any of these cited references that if the driving device/ methodology of Inoue was modified so as to yield the driving device f claim 22, such a driving device would be reasonably successful.

Applicants respectfully submit that at least the foregoing reasons distinguishing the driving device of claim 22 from the cited combination of references also applies to distinguish the claims 27, 48-49 and 52 from the identified combination of references.

It is respectfully submitted that claims 22, 27, 48-49 and 52 are patentable over the cited reference(s) for the foregoing reasons.

CLAIM 16

Claim 16 stands rejected as being unpatentable over Hirai, et al. [USP 5,874,933; "Hirai"] in view of and Okada et al. [USP 5,621,426; "Okada"] for the reasons provided on pages 8-9 of the above referenced Office Action. Applicants respectfully traverse.

Applicants claim, claim 16, a method for driving an image display device, such a method displaying tones by modulating a pulse width of a two-value voltage supplied to signal lines. Such a method further includes having a resistance of a transistor which switches ON or OFF signal application from the signal lines to pixels being increased with time from a beginning to

an end of an application time of a single pixel, where the application time of the single pixel is 1 horizontal period.

As indicated herein, while Hirai teaches that the pulse width modulation technique is well known, the inquiry does not end there, as it also is required to determine what Hirai teaches as to the prior art. As previously indicated by Applicants, Hirai teaches away from the use of the so-called well known pulse-width modulation technique, more specifically, Hirai teaches that since it is difficult to use the PHM (phase modulation) or PWM (pulse width modulation) method in order to display a multi-gradation picture on a liquid crystal display unit of simple matrix type, a driving method different from the PWM method, is adopted in the invention being described in Hirai.

As provided in MPEP-2145 (XD) a prior art reference that "teaches away" from the claimed invention is significant factor to be considered in determining obviousness. It also is provided therein that the totality of the prior art must be considered, and proceeding contrary to accepted wisdom in the art is evidence of non-obviousness. *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986). Thus, when the totality of the prior art is considered including the teachings of and Hirai, one can see that Hirai art teaches away from the use of a pulse width modulation technique.

As indicated in the discussion above regarding claim 22, Okada, does not anywhere disclose, teach or suggest a driving device of an image display device which includes *inter alia* a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines so that a resistance of a transistor for switching ON or OFF signal application from the signal

lines to the pixels is increased with time from a beginning to an end of an application time of a single pixel. Applicants also respectfully submit that there is no teaching suggestion, or motivation offered in either Hirai or Okada for modifying the driving circuit disclosed in Hirai so as to yield such a driving circuit. Moreover, there is no teaching or suggestion offered in any of these cited references that if the driving device/ methodology of Hirai was modified so as to yield the driving device claimed by Applicants, such a driving device would be reasonably successful. As also admitted in the Office Action, Hirai does not include such a teaching or suggestion either. Thus, it can hardly be said that the combination of Okada and Hirai discloses, teaches or suggest a methodology for driving an image display device in which, *inter alia*, the resistance of a transistor that switches ON *or* OFF signal application from the signal lines to pixels is increased with time from beginning to an end of an application time of a single pixel, and more specifically, where the application time of the single pixel is 1 horizontal period.

It is respectfully submitted that claim 16 is patentable over the cited reference(s) for the foregoing reasons.

CLAIM 17

Claim 17 stands rejected as being unpatentable over Hirai, et al. [USP 5,874,933; "Hirai"] in view of and Okada et al. [USP 5,621,426; Ohkada"] and Yanagi, et al. [USP 6,359,607; "Yanagi"] for the reasons provided on pages 8-9 of the above referenced Office Action. Applicants respectfully traverse.

Claim 17 depends from claim 16, and as indicated in the discussion regarding claim 16, Okada, does not anywhere disclose, teach or suggest a driving device of an image display device which includes *inter alia* a scanning line driving section for varying an amplitude of a voltage supplied to the scanning lines so that a resistance of a transistor for switching ON *or* OFF signal application from the signal lines to the pixels is increased with time from a beginning to an end of an application time of a single pixel. Applicants also respectfully submit that there is no teaching suggestion, or motivation offered in any of these cited references for modifying the driving circuit disclosed in Hirai so as to yield such a driving circuit. Moreover, there is no teaching or suggestion offered in any of these cited references that if the driving device/ methodology of Hirai were modified so as to yield the driving device claimed by Applicants, such a driving device would be reasonably successful. As such, at least for this reason and at least because of its dependency from a base claim believed to be allowable, claim 17 is considered to patentable over the cited combination of references.

It is respectfully submitted that claim 17 is patentable over the cited reference(s) for the foregoing reasons.

CLAIMS 28-30, 34, 36 & 37

Claims 28-30, 34, 36 and 37 stand rejected as being unpatentable over Yoshida et al. [USP 6,496,160; "Yoshida"] in view of Sim [USP 6,091,390] for the reasons provided on pages 9-11 of the above referenced Office Action.

The Office Action asserts that Yoshida teaches an activematrix-driven image display device substantially as set forth in the claims, except that for example in the case of claim 28, Yoshida does not describe or teach a step up circuit. The Office Action further asserts that Sim discloses a level shifter and thus concludes that the image display device is yielded by the combination of the teachings of Yoshida and Sim. Applicants respectfully traverse.

Applicants claim, claim 28, an activematrix-driven image display device including an image display panel for displaying an image by switching by a plurality of active elements, a voltage varying circuit and step-up circuit. The voltage varying circuit varies a voltage of a signal for driving the active elements according to temperature change of the image display panel, so as to carry out temperature compensation of the active elements. The step-up circuit steps up a signal voltage for driving the active elements and the signal voltage for driving the active elements is stepped up by the step-up circuit after being varied by the voltage varying circuit. Further, the image display panel carries out tone display by phase modulation driving.

As amended, claim 28 claims an image display device in which tones are displayed using phase modulation driving (pulse width modulation driving). As to the primary reference forming the within grounds for rejection, Yoshida, this reference does not teach or disclose performing tone display by the phase modulating.

Hirai does disclose phase modulation driving/ pulse width modulating driving, however, Hirai discloses a structure of multiple tone display with a simple-matrix type liquid crystal element, that is difficult to make compatible with pulse PHM (phase modulation) or PWM pulse width modulation. As such, Hirai discloses or adopts a different driving method. As such, Hiari

teaches away from and thus cannot be said to teach a structure that carries out tone display by phase modulating driving. Thus, Applicants respectfully submit that the combination of references, when all of the teachings of these references are considered, cannot be used to assert a teaching of the present invention.

Further and as indicted herein, the limitations of claim 31 were added to claim 28. Such an image display device becomes almost immune to power loss in increasing/ decreasing the voltage, as the phase modulating driving uses only binary driving voltage. Thus, the liquid crystal display is driven with low power consumption. See also for example, the discussion in the subject application regarding the sixth embodiment.

Also and in contrast to the present invention, Yoshida describes a methodology and driver in which a voltage correction is made to the data signal being outputted by the driver to the signal lines. Yoshida nowhere suggest, describes or teaches varying the voltage of a signal for driving the active elements according to a temperature change of the display panel. Yoshida merely describes how the properties of the liquid crystal material making up the display can vary as the temperature fluctuates. There is no discussion therein as to the temperature dependency of the active elements and how when the active elements are used in a device embodying a pulse width modulation technique, as is done in the subject application.

More particularly, Yoshida describes that temperature correction is applied with respect to a voltage of a signal immediately before it is supplied to an active matrix panel 73 (column 13, line 36 to column 14, line 20). Yoshida *does not* indicate that temperature compensation is

applied with respect to a power voltage before it is stepped up, and the voltage thus subjected to temperature compensation is then stepped up and supplied to the panel.

It thus can hardly be said, as is asserted in the Office Action, that Yoshida teaches an activematrix-driven image display device in which the voltage varying circuit varies a voltage of a signal for driving the active elements according to temperature change of the image display panel, so as to carry out temperature compensation of the active elements. As to the secondary reference, Sim is being referred to for a limited purpose; thus, Applicants respectfully submit that claim 28 is distinguishable from the cited combination of references. Applicants, however, provide the following observations as to the secondary reference, Sim.

Sim merely describes that a level shifter 44 compensates for the level difference between digital comparator 43 and DAC 42 (see col. 3, lines 10-22 thereof). Sim *does not* disclose and indicate temperature compensation of active elements, and which of the temperature compensation and the voltage step-up is first processed.

Applicants respectfully submit that at least the foregoing reasons distinguishing the activematrix-driven image display of claim 22 from the cited combination of references also applies to distinguish the image display device of claims 29-30, 34; the driving device of an activematrix-driven image display device of claim 36 and the driving method of an activematrix-driven image display device of claim 37, from the identified combination of references.

It is respectfully submitted that claims 28-30, 34, 36 and 37 are patentable over the cited reference(s) for the foregoing reasons.

CLAIMS 32 & 54-58

Claims 32 and 54-58 stand rejected as being unpatentable over Yoshida et al. [USP 6,496,160; "Yoshida"] in view of Sim [USP 6,091,390] and further in view of Mizutome et al. [USP 6,037,920; "Mizutome"] for the reasons provided on page 12 of the above referenced Office Action.

Claims 32 and 54-56 depend directly or ultimately from claim 28, which claim as indicated above is considered to be allowable over the combination of Yoshida and Sim. Also, claims 57-58 depend directly or ultimately from claim 36, which claim as indicated above is considered to be allowable over the combination of Yoshida and Sim. Thus, and at least because of its dependency from a base claim believed to be allowable, any of claims 32 and 54-58 also are considered to be allowable.

As to Mizutome, this reference as with Yoshida, describes a process for dealing with the changing properties of the liquid crystal material of the liquid crystal display due to temperature fluctuations and thus can hardly be said to disclose an image display device in which the scanning signal is varied according to temperature change of the display panel. More specifically, Mizutome indicates that the temperature compensation of a liquid crystal panel 101 is performed by switching a drive voltage between 20V and 15V, depending on whether the temperature of the liquid crystal panel 101 is within a range of 0-30°C or higher than 30°C (see col. 4, lines 17-37 thereof). Mizutome, unlike the present invention, does not disclose that temperature compensation of active elements is performed depending on a change in temperature

of an image display panel. As such claim 32 is further distinguishable from the cited combination of Yoshida, Sim and Mizutome.

As to claims 54-58, these claims describe a structure in which a constant current flow is supplied to a drain electrode of the active element with increase in temperature, so as to avoid temperature dependency of the fall of the drain voltage with respect to the input signal. None of the above-identified references disclose or teach such a structure.

It is respectfully submitted that claims 32 and 54-58 are patentable over the cited reference(s) for the foregoing reasons.

CLAIMS 33, 44-45, 50-51 & 53

Claim 33 stands rejected as being unpatentable over Yoshida et al. [USP 6,496,160; "Yoshida"] in view of Sim [USP 6,091,390] and further in view of Wood et al. [USP 5,926,162; "Wood"] for the reasons provided on page 12 - 13 of the above referenced Office Action. It would appear from the remarks on page 13, that the within rejection also applies to claims 44-47, 50, 51 and 53.

Each of claims 33, 44-47, 50-51 and 53 depends from a respective independent claim, which independent claim as indicated above is considered to be allowable. Thus, and at least because of its dependency from a base claim believed to be allowable, any of claims 33, 44-47, 50-51 and 53 also are considered to be allowable.

As to Wood, this reference as with Yoshida, describes a process for dealing with the changing properties of the liquid crystal material of the liquid crystal display due to temperature

fluctuations and thus can hardly be said to disclose an image display device in which the scanning signal is varied according to temperature change of the display panel (*e.g.*, see col. 2, lines 55-58 of Wood). More specifically, Wood indicates that a voltage applied to a common electrode 114 is adjusted so that the common electrode voltage is the average of the maximum and minimum source drive signals Sn, so as to compensate for the variations in the common electrode 114 voltage (see col. 9, lines 42-45, lines 53-58 thereof). Wood, unlike the present invention, does not disclose that temperature compensation of active elements is performed depending on a change in temperature of an image display panel, so as to constantly supply a constant current flow to a drain electrode. As such claim 33 is further distinguishable from the cited combination of Yoshida, Sim and Mizutome.

Applicants also note that the fourth embodiment of Hirai describes a combination structure of an amplitude modulation method using a virtual line for each sub-group, and a frame modulation method using a plurality of display frames and middle tones that are expressed by the number of on-state and off-state. Such a structure uses a different modulation manner from that of the present invention.

As to the assertion in the Office Action regarding claims 46-47 and 50-51 and 53, that the amplitude of the liquid crystal display inherently has a lower voltage upon the negative application, Applicants make the following observations. As to the voltage applied to the liquid crystal, it is required that the positive writing and the negative writing are symmetrical to each other. The structure of the present invention, and as set forth in the claims, can achieve the

conditions described in the claims so as to realize the particular driving performing voltage application symmetrical in polarity.

It is respectfully submitted that claims 33, 44-47, 50-51 and 53 are patentable over the cited reference(s) for the foregoing reasons.

The following additional remarks shall apply to each of the above.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).. As provided above, the references cited, alone or in combination, include no such teaching, suggestion or motivation.

Furthermore, and as provided in MPEP 2143.02, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 19866). Additionally, it also has been held that if the proposed modification or combination would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. Further, and as provided in MPEP-2143, the teaching or suggestion to make the claimed combination and the reasonable suggestion of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d

488, 20 USPQ2d 1438 (Fed. Cir. 1991). As can be seen from the forgoing discussion regarding the disclosures of the cited references, there is no reasonable expectation of success provided in the references. Also, it is clear from the foregoing discussion that the modification suggested by the Examiner would change the principle of operation of the device and methodology disclosed in the respective primary reference.

The Federal Circuit also has indicated that a prior art reference that gives only general guidance and is not all that specific as to particular forms of a claimed invention and how to achieve it, may make a certain approach obvious to try, but does not make the invention obvious. *Ex Parte Obukowicz*, 27 USPQ2d 1063, citing *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673,1681 (Fed. Cir. 1988).

As the Federal circuit has stated, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260,1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. *Para-Ordance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.2d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995).

It is respectfully submitted that for the foregoing reasons, claims 7-9, 16, 17, 19-22, 24-27, and 44-53 are patentable over the cited reference(s) and therefore, satisfy the requirements of 35 U.S.C. §103. As such, these claims, including the claims dependent therefrom are allowable.

CLAIMS 10-13 & 38-43

In the above-referenced Office Action, claims 10-13 and 38-43 were objected to as being dependent upon a rejected base claim. It also was provided in the above-referenced Office Action, however, that these claims would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claim(s).

In as much as Applicants believe that the respective base claim for each of claims 10-13 and 38-43 is in allowable form, claims 10-13 and 38-43 were not re-written in independent form as suggested by the Examiner. Applicants, however, reserve the right to later amend the subject application so as to present any one or more of these claims in independent form or to add one or more independent claims that contain the limitations of any one or more of claims 10-13 and 38-43.

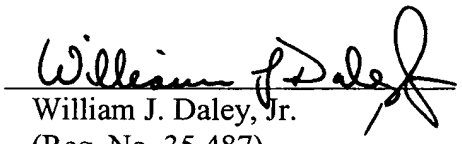
It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed

for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,
Edwards & Angell, LLP

Date: December 21, 2004

By: 

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